

Grade 5 Unit 4

Properties of Matter

Early April through June/MP 4

Unit Summary

- The unit on matter helps students develop the idea that matter of any type can be subdivided into particles that are too small to see but even then the matter still exists and can be detected by other means. By the end of the unit, students will be able to conclude that matter WILL ALWAYS be present.
- Understandings to include:
 - When two or more different substances are mixed, a new substance with different properties may be formed.
 - Measurements of a variety of properties can be used to identify materials.

Concepts	Vocabulary
<ul style="list-style-type: none"> ● Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. ● Measurements of a variety of properties can be used to identify materials. (At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) 	<p>matter, property, characteristic, physical properties, chemical properties, substance, chemical reaction, transform, solid, liquid, gas, color, hardness, magnetic forces, heat properties, solubility, acid, alkaline, neutral</p>

Stage 1 – Desired Results (Also see Disciplinary Core Ideas below)

Performance Expectations:

- **5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen**
 - **Clarification Statement:** Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.
 - **Assessment Boundary:** Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.
- **5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.**
 - **Clarification Statement:** Examples of reactions or changes could include phase changes, dissolving, and mixing that forms new substances
 - **Assessment Boundary:** Assessment does not include distinguishing mass and weight.
- **5-PS1-3. Make observations and measurements to identify materials based on their properties.**
 - **Clarification Statement:** Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.
 - **Assessment Boundary:** Assessment does not include density or distinguishing mass and weight.
- **5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.**

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3) <p>Developing and Using Models</p> <ul style="list-style-type: none"> • Use models to describe phenomena. (5-PS1-1) 	<p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none"> • Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3) • Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1) 	<p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> • Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-3) • Natural objects exist from the very small to the immensely large. (5-PS1-1)

<p>Enduring Understandings (What are the big ideas?)</p> <p>Students will understand that:</p> <ul style="list-style-type: none"> • Matter changes but never disappears • Properties of matter may change depending on interaction with other substances 	<p>Essential Questions</p> <ul style="list-style-type: none"> • When matter changes what happens? • How can one explain the form, properties, and interactions of matter?
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Stage 2 – Model Assessments

<p>Summative Performance Task(s):</p> <ul style="list-style-type: none"> • Develop a model to describe that matter is made of particles too small to be seen. • Conduct an investigation to determine whether the mixing of two or more substances results in new substances. 	<p>Formative Evidence: Through what other evidence will students demonstrate achievement of the desired results?</p> <ul style="list-style-type: none"> • (Suggested) 2-4 question comprehension checks • Teacher observation
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<ul style="list-style-type: none"> ● Audience: ● Peers/ teacher <p>Criteria:</p> <ul style="list-style-type: none"> ● Rubric, observation, self reflection 	<ul style="list-style-type: none"> ● Class Discussion/ Anecdotal notes ● (possible) Mystery Science end-of-mystery assessment ● Make observations and measurements to identify given materials based on their properties
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Stage 3 – Learning Plan Resources and Activities

Suggested Resources for Planning:

- Mystery Science
- NewsELA
- Super Science
- <https://www.getepic.com/> (free)
- Brainpop
- NJCTL.org
- thewonderofscience.com
- other free online resources
- Scholastic
- Scholastic Study Jams Properties of Matter: <https://www.scholastic.com/teachers/activities/teaching-content/matter-9-studyjams-interactive-science-activities/>
- Chem4kids States of Matter: http://www.chem4kids.com/files/matter_intro.html
- The gooey properties of matter (Scholastic): <https://www.scholastic.com/teachers/lesson-plans/teaching-content/exploring-goo-ey-properties-matter/>
- Properties of Matter: <http://msjeffcoatsscienceclass.weebly.com/properties-of-matter.html>
- Teach Engineering: https://www.teachengineering.org/activities/view/nyu_statesofmatter_activity1

Learning Activities:

- Mystery Science mysteries:
 - **Chemical Magic (Chemical Reactions and Properties of Matter)**
 - **Mystery: Introduction to Chemistry** [Are magic potions real](#)
 - **Mystery: Particulate Nature of Matter** [Could you transform something worthless into gold??](#)
 - **Mystery: Acids, Reactions, and Properties of Matter** [What would happen if you drank a glass of acid?](#)
 - **Mystery: Chemical Reactions** [What do fireworks, rubber, and silly putty have in common?](#)
 - **Mystery: Gases and Particulate Natures of Matter** [Why do some things explode?](#)
- Mixing and combining substances
- Observing and measuring materials based on properties
- “What’s the Matter?” webquest [Webquest: What's the Matter?](#)
- Scholastic: [Scholastic: Study Jams \(matter, solids, liquids, gases\)](#)

(project; copy & paste)

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Suggested Methods: (The following methods anchor learning with a purpose, mitigating the “why do I need to know this” questions.)

- Phenomena based learning
- Problem Based Learning (PBL)
- Inquiry Based Learning
- Case studies
- Engaging in Argument w/ evidence